

## WHAT IS CLAIMED IS:

1           1. For use in a wireless communication system, an  
2 integrated circuit comprising:

3           a set of integrated circuit capacitors each  
4 independently capable of being selectively switched into  
5 or out of an inductive-capacitive resonant circuit; and

6           a capacitance selection controller receiving a  
7 signal representative of a difference between a resonant  
8 frequency of the inductive-capacitive resonant circuit  
9 and a reference frequency,

10           wherein the capacitance selection controller  
11 controls switching of one or more of the integrated  
12 circuit capacitors into or out of the inductive-  
13 capacitive resonant circuit in response to the difference  
14 between the resonant and reference frequencies to alter  
15 the resonant frequency towards the reference frequency.

1           2.    The integrated circuit according to claim 1,  
2    wherein the inductive-capacitive resonant circuit further  
3    comprises:

4           at least one inductor; and  
5           one of:

6           at least one of the integrated circuit  
7    capacitors within the set, or  
8           at least one capacitor which cannot be selectively  
9    switched into or out of the inductive-capacitive resonant  
10   circuit, alone or with any combination of the integrated  
11   circuit capacitors within the set.

1           3.    The integrated circuit according to claim 1,  
2    wherein the set of integrated circuit capacitors further  
3    comprises:

4           a sequence of varying capacitances each equal to a  
5    multiple of an adjacent capacitance within the sequence,  
6    wherein the sequence is scaled from a capacitance  
7    corresponding to a maximum frequency adjustment, a  
8    capacitance corresponding to a minimum frequency  
9    adjustment, or both.

1           4. The integrated circuit according to claim 3,  
2 wherein the set of integrated circuit capacitors includes  
3 n parallel branches and integrated circuit capacitors  
4 within the set are switched into or out of the inductive-  
5 capacitive resonant circuit by an n bit binary count of  
6 pulses representative of the difference between the  
7 resonant and reference frequencies.

1           5. The integrated circuit according to claim 1,  
2 wherein the set of integrated circuit capacitors are  
3 disposed within an oscillator stage for an integrated  
4 circuit tuner, the integrated circuit tuner further  
5 comprising:

6           a counterpart set of integrated circuit  
7 capacitors each independently capable of being  
8 selectively switched into or out of an inductive-  
9 capacitive resonant circuit within an amplifier stage for  
10 the integrated circuit tuner, wherein the capacitance  
11 selection controller concurrently switches into or out of  
12 the inductive-capacitive resonant circuit within the  
13 amplifier stage any of the counterpart integrated circuit  
14 capacitors which correspond to the one or more integrated  
15 circuit capacitors switched into or out of the inductive-  
16 capacitive resonant circuit within the oscillator stage.

1           6. The integrated circuit according to claim 1,  
2 wherein the set of integrated circuit capacitors are  
3 disposed within an oscillator for an integrated circuit  
4 tuner, the integrated circuit tuner further comprising:  
5           a frequency divider within a feedback loop from  
6 the oscillator to a phase detector receiving the  
7 reference frequency and generating the signal  
8 representative of the difference between the resonant and  
9 reference frequencies.

1           7. The integrated circuit according to claim 1,  
2 wherein the set of integrated circuit capacitors are  
3 arranged in parallel branches each including a series-  
4 connected capacitor pair and a low impedance switch  
5 coupling a respective branch to a virtual ground.

1           8. For use in a wireless communication system, a  
2 receiver comprising:

3               a connection for selectively coupling the  
4 receiver to an antenna receiving wireless signals; and  
5               an integrated circuit tuner coupled to the  
6 connection, the integrated circuit tuner comprising:

7               a set of integrated circuit capacitors  
8 each independently capable of being selectively  
9 switched into or out of an inductive-capacitive  
10 resonant circuit; and

11              a capacitance selection controller  
12 receiving a signal representative of a difference  
13 between a resonant frequency of the inductive-  
14 capacitive resonant circuit and a reference  
15 frequency,

16              wherein the capacitance selection  
17 controller controls switching of one or more of the  
18 integrated circuit capacitors into or out of the  
19 inductive-capacitive resonant circuit in response to  
20 the difference between the resonant and reference  
21 frequencies to alter the resonant frequency towards  
22 the reference frequency.

1           9. The receiver according to claim 8, wherein the  
2 inductive-capacitive resonant circuit further comprises:  
3           at least one inductor; and  
4           one of:  
5           at least one of the integrated circuit capacitors  
6 within the set, or  
7           at least one capacitor which cannot be selectively  
8 switched into or out of the inductive-capacitive resonant  
9 circuit, alone or with any combination of the integrated  
10 circuit capacitors within the set.

1           10. The receiver according to claim 8, wherein the  
2 set of integrated circuit capacitors further comprises:  
3           a sequence of varying capacitances each equal to a  
4 multiple of an adjacent capacitance within the sequence,  
5 wherein the sequence is scaled from a capacitance  
6 corresponding to a maximum frequency adjustment, a  
7 capacitance corresponding to a minimum frequency  
8 adjustment, or both.

1           11. The receiver according to claim 10, wherein the  
2 set of integrated circuit capacitors includes  $n$  parallel  
3 branches and integrated circuit capacitors within the set  
4 are switched into or out of the inductive-capacitive  
5 resonant circuit by an  $n$  bit binary count of pulses  
6 representative of the difference between the resonant and  
7 reference frequencies.

1           12. The receiver according to claim 8, wherein the  
2 set of integrated circuit capacitors are disposed within  
3 an oscillator stage for the integrated circuit tuner, the  
4 integrated circuit tuner further comprising:  
5           a counterpart set of integrated circuit capacitors  
6 each independently capable of being selectively switched  
7 into or out of an inductive-capacitive resonant circuit  
8 within an amplifier stage for the integrated circuit  
9 tuner, wherein the capacitance selection controller  
10 concurrently switches into or out of the inductive-  
11 capacitive resonant circuit within the amplifier stage  
12 any of the counterpart integrated circuit capacitors  
13 which correspond to the one or more integrated circuit  
14 capacitors switched into or out of the inductive-  
15 capacitive resonant circuit within the oscillator stage.

1           13. The receiver according to claim 8, wherein the  
2 set of integrated circuit capacitors are disposed within  
3 an oscillator for the integrated circuit tuner, the  
4 integrated circuit tuner further comprising:

5           a frequency divider within a feedback loop from  
6 the oscillator to a phase detector receiving the  
7 reference frequency and generating the signal  
8 representative of the difference between the resonant and  
9 reference frequencies.

1           14. The receiver according to claim 8, wherein the  
2 set of integrated circuit capacitors are arranged in  
3 parallel branches each including a series-connected  
4 capacitor pair and a low impedance switch coupling a  
5 respective branch to a virtual ground.



1           15. For use in a wireless communication system, a  
2 method of tuning a receiver comprising:  
3           receiving a signal representative of a  
4 difference between a resonant frequency of an inductive-  
5 capacitive resonant circuit and a reference frequency;  
6 and  
7           in response to a difference between the  
8 resonant and reference frequencies, selectively switching  
9 one or more integrated circuit capacitors from a set of  
10 integrated circuit capacitors, each independently capable  
11 of being selectively switched into or out of the  
12 inductive-capacitive resonant circuit, into or out of the  
13 inductive-capacitive resonant circuit to alter the  
14 resonant frequency towards the reference frequency.

1           16. The method according to claim 15, further  
2 comprising:  
3           exciting at least one inductor within the inductive-  
4 capacitive resonant circuit together with one of:  
5           all of the integrated circuit capacitors within the  
6 set which are switched into the inductive-capacitive  
7 resonant circuit, or  
8           at least one capacitor which cannot be selectively  
9 switched into or out of the inductive-capacitive resonant  
10 circuit, alone or with all of the integrated circuit  
11 capacitors within the set which are switched into the  
12 inductive-capacitive resonant circuit.

1           17. The method according to claim 15, wherein the  
2 step of selectively switching one or more integrated  
3 circuit capacitors from a set of integrated circuit  
4 capacitors into or out of the inductive-capacitive  
5 resonant circuit to alter the resonant frequency towards  
6 the reference frequency further comprises:

7           switching selected capacitors providing, in  
8 combination, a desired capacitance from a sequence of  
9 varying capacitances each equal to a multiple of an  
10 adjacent capacitance within the sequence, wherein the  
11 sequence is scaled from a capacitance corresponding to a  
12 maximum frequency adjustment, a capacitance corresponding  
13 to a minimum frequency adjustment, or both.

1           18. The method according to claim 17, wherein the  
2 set of integrated circuit capacitors includes n parallel  
3 branches and the step of selectively switching one or  
4 more integrated circuit capacitors from a set of  
5 integrated circuit capacitors into or out of the  
6 inductive-capacitive resonant circuit to alter the  
7 resonant frequency towards the reference frequency  
8 further comprises:

9           switching integrated circuit capacitors within  
10 the set into or out of the inductive-capacitive resonant  
11 circuit by an n bit binary count of pulses representative  
12 of the difference between the resonant and reference  
13 frequencies.

1           19. The method according to claim 15, wherein the  
2 set of integrated circuit capacitors are disposed within  
3 an oscillator stage for an integrated circuit tuner, the  
4 method further comprising:

5           in response to the difference between the resonant  
6 and reference frequencies, concurrently switching into or  
7 out of an inductive-capacitive resonant circuit within an  
8 amplifier stage for the integrated circuit tuner any  
9 integrated circuit capacitors from a counterpart set of  
10 integrated circuit capacitors, each independently capable  
11 of being selectively switched into or out of the  
12 inductive-capacitive resonant circuit within the  
13 amplifier stage, which correspond to the one or more  
14 integrated circuit capacitors switched into or out of the  
15 inductive-capacitive resonant circuit within the  
16 oscillator stage.

1           20. The method according to claim 15, wherein the  
2 set of integrated circuit capacitors are disposed within  
3 an oscillator for an integrated circuit tuner, the method  
4 further comprising:  
5           receiving the reference frequency;  
6           dividing an output frequency of the oscillator;  
7 and  
8           generating the signal representative of the  
9 difference between the resonant and reference frequencies  
10 from the reference frequency and the divided output  
11 frequency of the oscillator.